CS 475/575

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Project #7

Autocorrelation using MPI

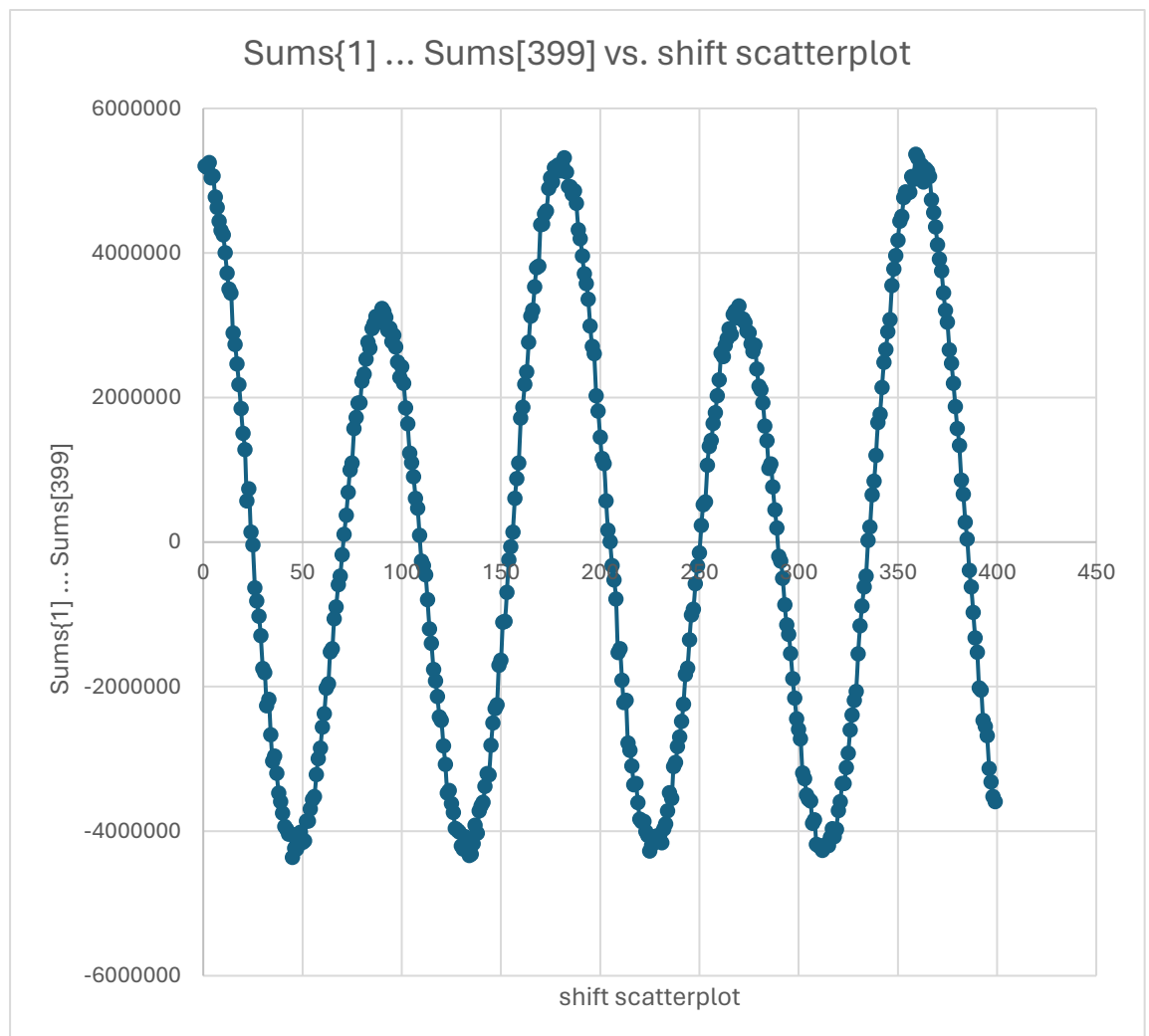1. Show the Sums{1] ... Sums[399] vs. shift scatterplot.

Figure1

2. State what the two secret sine-wave periods are.

The period of the first sine wave, at peak 94, the value is 2960195. At peak 270, the value is 3268799.5. This shows that the period of the first sine wave is approximately 270−94=176

The period of the second sine wave, at peak 182, the value is 5316669.At peak 359, the value is 5366828.This shows that the period of the second sine wave is approximately 359−182=177

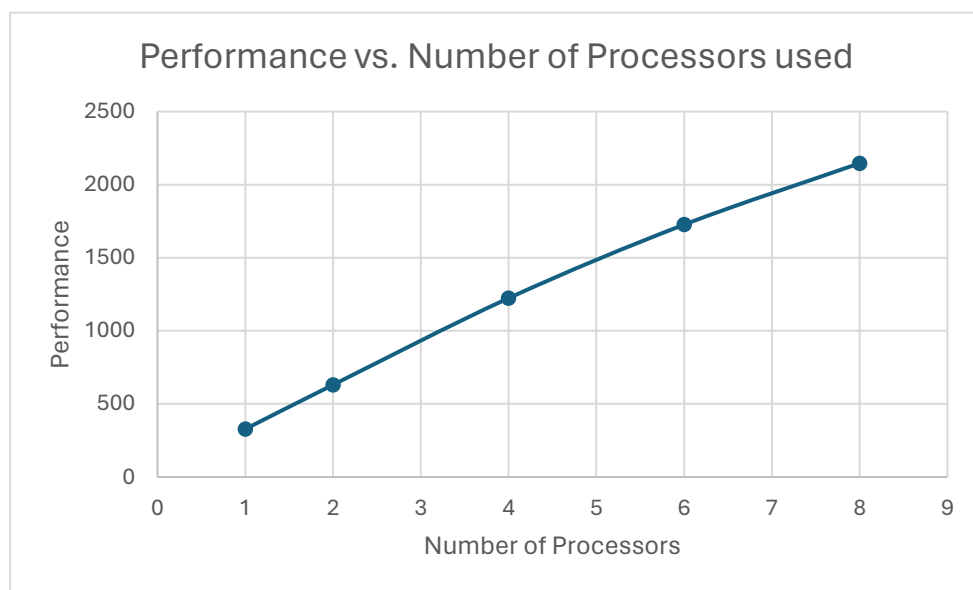3. Show your graph of Performance vs. Number of Processors used.

Figure2

4. What patterns are you seeing in the performance graph?

As shown in Figure 2, as the number of processors increases, the performance gradually increases. The growth of performance shows a roughly linear trend, that is, every time a certain number of processors is added, the performance will increase accordingly.

5. Why do you think the performances work this way?

When the number of processors increases from 1 to 4, the computing load shared by each processor is significantly reduced, and the computing efficiency is greatly improved. Multiple processors

working together can complete autocorrelation calculations faster. As the number of processors further increases, performance growth may gradually slow down because synchronization overhead may increase.